

High-density event locations with high-density OBS network at off-Ibaraki region

*Shinji Yoneshima¹, Kimihiro Mochizuki¹

1. Earthquake Research Institute, The University of Tokyo

Until 2011 Tohoku-oki earthquake, off-Ibaraki region has been known to be seismically inactive, not only large but even small-to-moderate earthquakes. In this region, a subducting seamount was discovered by Mochizuki et al (2008) in this low seismicity area, and a weak coupling was suggested to account for this low seismicity.

Just after 2011 Tohoku-oki earthquakes, many earthquakes had occurred including the largest aftershock (Mw7.8) of Tohoku-oki earthquake. This suggests that this region is seismically active, presumably as an interaction with the seamount subduction.

Six months before and after the Tohoku-oki e.q. a high-density OBS survey had been conducted from October 2010 to September 2011 with quite dense (6km) spacing. In this OBS experiment, quite a large number of earthquakes (>60,000) were recorded and ~20000 events were located.

A tomography with a double difference hypocenter relocation was applied to obtain the velocity structure and especially the precise hypocenter locations.

The relocated hypocenters formed some clusters in a three-dimensional space. We focused on a cluster that was aligned along the near-vertical direction, whereas many clusters are aligned along the dip and strike directions of the subducting oceanic plate.

This vertically aligned cluster ranges from approximately 8 to 24 km depth, corresponding to above the plate boundary to below the plate boundary, perhaps below Moho. We made a common station gather for these events, which is analogous to a zero-offset reverse VSP (station is located on the seafloor and sources in the underground along a near-vertical trajectory).

We will discuss whether there are any featured converted phases in this gather such as a reflection from the plate boundary so as to gain an insight about the precise depth information of these earthquakes in conjunction with the subducting seamount.